

CONTROLLABLE PIXEL BORDER  
FOR IMPROVED VIEWABILITY  
OF A DISPLAY DEVICE

ABSTRACT OF THE INVENTION

5 A display device having a display matrix ( $m+2x$  by  $n+2x$ ) including an active, e.g., controllable, pixel border located around the edge locations of a frame buffer matrix for improved character viewability. The border can be several pixels wide, e.g.,  $1 < x < 5$ . In one embodiment, the border is two pixels wide and surrounds a liquid crystal display (LCD) matrix area having ( $m \times n$ ) pixels that are controlled by a frame

10 buffer memory. In one embodiment, the pixels of the border are active pixels and each contain a red, a green and a blue subpixel. The pixel border is useful for increasing viewability, e.g., contrast, of characters that are displayed along the edge of the LCD matrix area in a frame buffer region. The invention includes a border attribute register for containing a color attribute and a brightness attribute, in one

15 embodiment. The border attribute register can be set by an operating system command and can be read by a timing generator which generates the appropriate signals for controlling the border pixels. These signals are generated during special periods which otherwise carry invalid data with respect to the frame buffer matrix. In this way, the invention is backward compatible with application programs that use

20 only the frame buffer memory region. Therefore, the active pixel border is advantageous in that it can be used with conventional character generation and display processes and formats. In one embodiment, the novel display can be used within a portable computer system or other portable electronic device.